

REMARKS

At the outset, the Examiner is thanked for the thorough review and consideration of the pending application. The Office Action dated July 16, 2009 has been received and its contents carefully reviewed.

Claims 1-7 are amended. No new matter has been added. Accordingly, claims 1-16 are currently pending, of which claims 8-16 are withdrawn from consideration. Reexamination and reconsideration of the pending claims are respectfully requested.

The Office Action rejects claims 2, 3, 5, and 7 under 35 U.S.C. §112, second paragraph, as being indefinite. Applicants have amended claims 2-3, 5, and 7 to more clearly define claimed subject matter. Applicants, therefore, respectfully request withdrawal of the 35 U.S.C. §112, second paragraph, rejection of claims 2, 3, 5, and 7.

The Office Action rejects claims 1-7 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,415,888 to Banerjee et al. (*Banerjee*). Applicants respectfully traverse the rejection.

As required in M.P.E.P. § 2131, in order to anticipate a claim under 35 U.S.C. § 102, “the reference must teach every element of the claim.” *Banerjee* fails to teach all the elements of claims 1-7, and thus cannot anticipate these claims.

Claim 1 recites, “electrodes include (i) an anode comprising a gas diffusion layer and a catalyst material-containing active layer, and (ii) a cathode comprising a gas diffusion layer and a catalyst material-containing active layer, wherein the active layers of the anode and the cathode are formed on the gas diffusion layers of the anode and cathode.” *Banerjee* fails to teach at least these elements of claim 1. In fact, *Banerjee* only discloses that “[t]he catalytically active material is conventionally incorporated in the ink” and “[c]atalyst is added to the surface of the membrane in an ink or ink form.” *Banerjee*, column 5, lines 6-7, and column 6, lines 48-49, emphasis added. *Banerjee* does not teach coating catalyst material-containing active layer on either anode or cathode. Accordingly, claim 1 is allowable over *Banerjee*. Claims 2-7 variously depend from claim 1, and thus are also allowable for at least the same reasons as claim 1.

Applicants, therefore, respectfully request withdrawal of the 35 U.S.C. § 102(b) rejection of claims 1-7.

The Office Action rejects claim 2 under 35 U.S.C. §103(a) as being unpatentable over *Banerjee*. Applicants respectfully traverse the rejection.

To establish *prima facie* obviousness of a claimed invention, all the elements of the claim must be taught or suggested by the prior art. *Banerjee* fails to teach or suggest all the elements of claim 2, and thus cannot render claim 2 obvious.

Claim 2 depends from claim 1, and incorporates all the elements of claim 1. As discussed, *Banerjee* fails to teach or suggest at least the above-recited elements of claim 1, namely, “electrodes include (i) an anode comprising a gas diffusion layer and a catalyst material-containing active layer, and (ii) a cathode comprising a gas diffusion layer and a catalyst material-containing active layer, wherein the active layers of the anode and the cathode are formed on the gas diffusion layers of the anode and cathode.” Accordingly, claim 1 and its dependent claim 2 are allowable over *Banerjee*.

Furthermore, the membrane-electrode assembly prepared according to claim 1 shows unexpected and superior results. For example, the present application states that “the catalytic active layer is coated on each of the electrolyte membrane and the diffusion layer, and in forming the active layer on the diffusion layer, the viscosity of the active layer is controlled, in order to reduce interfacial and to increase catalyst availability and production rate ... the present invention aims to reduce interfacial resistance by coating the catalytic active layer on both the electrolyte membrane and the gas diffusion layer in the membrane-electrode assembly.” *Specification*, page 8, lines 24-29, and page 10, lines 2-5. The present application also states that “the ionomer membrane (Nafion membrane), an electrolyte membrane where the main reaction occurs, is coated with the catalytic active layer by an air spray process, and catalyst ink with high viscosity is coated on the gas diffusion layer (GDL) by screen coating or die coating. This allows the fabrication of the catalytic active layer without the loss of the catalyst into the diffusion layer ... a small amount of the catalytic layer is coated on the electrolyte membrane in order to reduce the interfacial resistance of the electrode, and most of the catalytic active layer is coated on the diffusion layer (an adhesion rate of more than 90% for a rotary screen printing

process) in order to increase the catalyst availability.” *Specification*, page 10, line 28 to page 11, line 5, page 11, lines 11-17. The present application further states that “the present invention utilizes a curtain coating process, such as screen printing, die coating or blade coating, which makes mass production easy.” *Specification*, page 11, lines 20-22. These unexpected results further establish that claim 1 and dependent claim 2 are not obvious in view of *Banerjee*.

Applicants, therefore, respectfully request withdrawal of the 35 U.S.C. §103(a) rejection of claim 2.

Applicants believe the application is in condition for allowance and early, favorable action is respectfully solicited. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at (202) 496-7500 to discuss the steps necessary for placing the application in condition for allowance. All correspondence should continue to be sent to the below-listed address.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. §1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911.

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Respectfully submitted,

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